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ABSTRACT

The purpose of this study was to compare the performance of ninth-grade slow readers with ninth-grade good readers and with sixth grade readers on a test of syntactic comprehension. The significant difference between the ninth-grade good readers' and the ninth-grade slow readers' performance on A Test of Sentence Meaning (ATSM), developed by Albert D. Marcus, clearly shows that comprehension of syntactic structure is an element in total reading comprehension. The low correlation between the total reading scores and the ATSM score would seem to indicate that it is not an important factor in reading at this level. The correlation of .70 between reading and the ATSM indicates that comprehension of syntactic structures is an important reading factor for sixth grade readers even on a survey reading test. It is suggested that the great difference in the correlations between the sixth-grade readers and the ninth-grade readers indicates that although these two groups measure on The Nelson Reading Test to be very similar with the same range and almost the same means, they must differ in at least one important respect. (LL)

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COMPREHENSION OF WRITTEN SYNTACTIC STRUCTURES BY GOOD READERS AND SLOW READERS

A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

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THE STATE UNIVERSITY OF NEW JERSEY

BY

BARBARA TAKAHASHI

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

MASTER OF EDUCATION

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CHAPTER I

THE PROBLEM

Purpose

The purpose of this study was to compare the performance of ninth-grade slow readers with ninth-grade good readers and with sixth-grade readers on a test of syntactic comprehension. This purpose was related to a concern for the importance in relation to reading comprehension as a whole, of syntactic structure, a concern which has received a new impetus in the last two decades. This appears to be due, in part, to the advent of transformational-generative grammars. This concern bears directly on the teaching of reading to slow readers. In this context, the question arises--is comprehension of syntactic structures a factor in retarding the progress of reading comprehension for slow readers?

Ninth-grade readers were chosen for this study both because they were an available population for this study and because ninth grade is the beginning of a period when students are exposed to a wide variety of reading material with very little reading guidance from content teachers. Much of this reading material is from

publications and books aimed at an adult audience. Textbooks become more difficult. Unlike recreational reading and some more juvenile texts, the logic of a paragraph can be closely worked, so that each sentence can be important in the careful construction of the author's argument. This means that students will be exposed to a wide variety of syntactic structures which might be vital to total comprehension.

The two groups, ninth-grade slow and ninth-grade good readers, were chosen for the purposes of comparison. If comprehension of syntax was not a real problem for slow readers, then there should be very little difference between the two groups on a test where vocabulary is controlled. The ninth-grade slow readers were students reading two or more grades below grade level at the time of the study with a bottom cutoff of 5.0 in terms of a grade equivalent. The reading range of the ninth-grade good readers spanned 8.7 to 10.5 in terms of grade equivalents.

The sixth-grade readers were chosen as subjects because the mean reading level of the ninth-grade slow readers in terms of a grade equivalent was 6.1. One concern of this study was to see if grade equivalents in total reading scores were reflected in the ability to perform successfully on a test of syntactic structure.

Introduction

Students have been exposed to oral language for most of their lives. However, they have been exposed to the process of learning to read for a considerably shorter period of time. Written English uses many formal constructions infrequently used in spoken English. It is the syntactic structures to which a reader will be exposed that is of concern to this study. The scope of this study, therefore, is restricted to the relationship of syntactic structure to reading and, more specifically, to reading comprehension. This relationship has been explored from a number of different angles.

In two studies of oral language development (Chomsky, 1971; Loban, 1966), it was found that the level of oral language achievement correlated positively with exposure to reading (Chomsky) or with the amount of reading (Loban). Exposure to reading, as Chomsky defines it, means both reading aloud to the subject or reading by the subject himself.

Other studies demonstrate that it is easier for a student to comprehend written passages that use the same language patterns as the student himself uses in oral language (Ruddell, 1965; Tatham, 1970). Related to this observation is Smith's (1970) finding that the ability to fill in written cloze passages is related to students'

and skilled adults' written syntax as measured by t units.

Those studies that are cross-sectional or longitudinal have shown that comprehension of syntactic structure (or the ability to demonstrate this comprehension) increases over age and grades (Carroll, 1970; Marcus, 1971; Smith, 1970).

Numerous studies have been concerned with students' ability to get meaning from specific structures. Marcus (1971) developed a test of the structures of modification, predication, complementation, and coordination using the principle of recovering deep structure from several sentences with the same deep structure but different surface structures. (Deep structure is the postulated abstract structure underlying sentences with all the information necessary for semantic interpretation of that sentence. Surface structure is the actual structure of a sentence [Wardhaugh, 1969].) Marcus found that students in the fifth through eighth grades showed an incomplete mastery of these structures, but an increasing ability to respond correctly to the test over the grades. This again seems to indicate that exposure to reading may be important.

Marcus' use of the theory of recovery of deep structure, as the basis of his test construction, meets Simons' (1970) criteria for an acceptable procedure for

studying reading comprehension. Simons, after reviewing other approaches to the study of reading comprehension, concluded that recovery of deep structure is one of the most promising approaches because it evolves from a theory of language. In his own study, Simons used the principle of recovery of deep structure.

This study used Marcus' test, A Test of Sentence Meaning (ATSM), to investigate slow ninth-grade readers' ability to recover meaning from the structures tested and compare this response with the responses of ninth-grade good readers and sixth-grade readers.

Statement of the Problem

Do slow ninth-grade readers comprehend written syntactic structures on approximately the same level as their peers, or do they comprehend written syntactic structures on approximately the sixth-grade level?

The hypotheses to be accepted or rejected by this study are:

Hypothesis A. There is no significant difference between the mean scores on the ATSM of the ninth-grade slow readers and the ninth-grade good readers.

Hypothesis B. There is no significant difference between the scores on the ATSM of the ninth-grade slow readers and sixth-grade readers who are placed in, and reading on, the mean reading grade level of the slow ninth-grade readers.

Importance of the Study

Smith and Mason (1972) state that there is apparently no advantage to simplifying syntactic structure in reading materials for older students reading below their grade level. They base this thesis on Smith's study (1970) using rewritten passages by students at various grade levels and skilled adults. He found that fourth-, tenth-, and eleventh-grade students distinguish between four levels of writing. Fourth-graders read fourth-grade writing best. Eleventh-graders, Smith reported, read fourth-grade writing with least facility, although older students (grades 10, 11, and 12) read all levels of writing significantly better than younger students (grades 4, 5, and 6). However, Smith did not use slow readers as a specific group in his study.

The results of this study should shed further light on the question of whether comprehension of syntax plays a significant role in reading comprehension and, more specifically, if slow readers have more difficulty with syntax than their peers, when vocabulary is controlled. This study should confirm or deny Smith's conclusion. This, in turn, should have implications for development and selection of reading material for the slow reader.

Although correlations do not always indicate

causation, one possible inference to be drawn from findings mentioned previously, which showed that students with better language mastery read more or were exposed to more reading, might be that a planned exposure to certain syntactic structures would be advantageous for slow readers. As Strickland (1962) pointed out in her study, basal readers seem to introduce various syntactic structures by chance and have no apparent plan to reinforce these structures by repetition as they do with vocabulary.

Definitions of Terms

Grade equivalents or grade level of reading. This was determined by the grade equivalency scores of The Nelson Reading Test. This test was chosen because its norms cover grades 3 through 9, so that one form would cover the grades involved in this study.

Comprehension. Comprehension in this paper means two different things: (a) comprehension of syntactic structure refers to the ability of the subjects to answer correctly the items on Marcus' A Test of Sentence Meaning; and (b) general comprehension refers to the ability of the subjects to answer comprehension questions successfully on the comprehension subtest of The Nelson Reading Test.

Ninth-grade slow readers. This category of ninth-grade subjects refers to readers who scored two or more

grade levels below the ninth-grade level at the time of this study. The lower level cutoff point is the fifth-grade reading level due to the vocabulary level of the criterion instrument used in this study. The upper level is 7.5. The mean grade equivalent for this group was 6.1.

Ninth-grade good readers. This category of ninth-grade subjects had a range in grade equivalents of 8.7 to 10.5. The mean grade equivalent of this group was 9.5.

Sixth-grade readers. This category refers to students placed in the sixth grade, with a range of 5.0 to 7.5 which is the same range as the ninth-grade slow readers. The mean grade equivalent of this group was 6.0.

Structural grammar (Thomas, 1965). Structural grammar is based on the idea of describing, in as rigorous a manner as possible, language as it actually exists. Unlike traditional grammar, which Thomas describes as intuitively and classically based, structural grammar is descriptive rather than prescriptive. Structural grammar separates syntax from semantics. Descriptions of parts of speech are given in syntactic terms with no appeal to meaning.

Structural grammar is based on levels of syntax (Thomas, 1965). The first level deals with basic sounds (phonemes); the second level deals with regular combinations of phonemes (morphemes, the smallest element that

has meaning); the third level deals with a combination of morphemes called 'phrase structure' level.

Transformational-generative grammar. This grammar is based on the linguistic theory of Noam Chomsky who developed the idea that linguistic analysis must discover what is universal and regular in man's innate ability to understand and produce new grammatical sentences (Hartman & Stork, 1972).

This grammar, according to Chomsky, is tripartite, consisting of (1) phrase-structure, (2) transformational structure, and (3) morphophonemics (Thomas, 1965). The 'phrase structure' deals with the elemental forms of language, incorporating some of the description of morphemes found in structural grammar. Rigorous rules for combining morphemes into simple (core or 'kernel') phrases are presented. The 'transformational structure' presents rigorous rules for combining phrases, e.g., rules for adding adjectives to noun phrases, or changing a sentence from active to passive voice. "Morphophonemics" incorporates developments by structural grammarians (particularly developments concerned with phonemics) as well as discoveries by historical grammarians. (Historical grammarians added to our knowledge of English by tracing changes in usage over time.)

Overview of the Study

The succeeding chapters include a review of the literature (Chapter II) which reviews studies related to frequent vs. infrequent language patterns, awareness of structure and reading comprehension, number and complexity of structures and reading; oral miscues and comprehension, sex and other possible moderating variables, and improvement of performance over age and grade. The chapter on procedures (Chapter III) discusses the instruments used, the population involved, and the study design. The chapter on findings (Chapter IV) presents data and discusses it in relation to the literature that has been reviewed. The final chapter (Chapter V) gives a summary and conclusions as well as suggestions for further research.

Limitations of the Study

Conclusions from this study are limited by the nature of the population involved, which is predominantly rural, small town or suburban, and white.

Results will be further limited by the grade levels involved.

Because of the limited available population for this study, randomization was not possible. The total available populations falling within the desired ranges was used. The sixth-grade group was particularly small

with only 18 subjects.

Limitations of the study include those imposed by the instruments. The ATSM does not cover all the possible syntactic structures or their combinations with which a reader comes in contact although Marcus took examples from each of the categories presented by the structuralist Nelson W. Francis. The ATSM was also found to be long and frustrating for the slow readers. The degree to which they may have slackened their efforts may limit the validity of their scores.

The need for a test with a wide range of norms and one which could be given within a single period necessitated the use of an instrument that placed a number of the subjects at the upper end of the norms.

CHAPTER II

REVIEW OF THE LITERATURE

Syntactic structure, as a subject for research, encompasses a large field of study. Most of the studies are concerned with oral language. Although oral language acquisition logically and in sequence precedes reading, generalizations about language acquisition and development cannot automatically be transferred to reading. A point that a number of researchers have made is that oral language development differs from reading in rate of acquisition, consciousness and deliberateness of instruction, delay of reinforcement, and modalities involved in the process (Singer, 1972). This literature survey is restricted to studies of the relationship of syntax with reading comprehension.

The studies reviewed in this chapter appear to fall into the following categories: (a) the relationship of language development to reading, (b) the use of frequent vs. less frequent language patterns, (c) awareness of structure and reading comprehension (which includes teaching language and reading), (d) number and complexity of structures and comprehension, (e) oral miscues and

comprehension, (f) sex and other possible moderating variables, and (g) improvement in comprehension over the grades.

The Relationship of Language Development to Reading

Chomsky's (1971) study was essentially a study of oral language competence in respect to certain complex aspects of English syntax. She also investigated exposure to written language as a source of input in language development. The degree of exposure to written language was measured by a complexity score for books, Huck's inventory of children's literary background, a master list of 400 books, and a detailed list of reading and materials read aloud. These measures were correlated with the stage of linguistic development of the children as determined in the first part of the study. Chomsky concluded that there was a strong correlation between these indexes of reading exposure and language development. The relationship of reading measures to linguistic stages is given in terms of a Kendall rank correlation due to the number of ties in the data. All the measures on the child questionnaire, master book list, and reading during a tracked week were found to be significant in relation to linguistic stages at the .05 level or beyond. Thirty-six children, ages 6-10, were the subject of this

study.

Loban (1966) conducted a multi-faceted longitudinal study (kindergarten through ninth grade) of children's language and the relation among their abilities in speaking, writing, listening, and reading. The study began with 338 subjects and still had 220 of them at the end of 10 years. Within the total group, two groups were studied intensively. One was designated the high group, one the low group. These two groups represented extremes on the normal curve in language proficiency as determined by teacher ratings in terms of eight factors of which reading was just one. In grades 4 through 9, the Stanford and California Achievement tests in reading were administered. The high group's median was always more than two years above chronological age. The low group began by reading one and a half years below chronological age, and in following years fell further behind. The total group was reading close to the expected age norm. The range was not as clear as there was an overlap by one member in each group.

Strickland (1962), working with grades 2 through 6, also found a definite relationship between structure of oral language and reading ability. In second grade, superior readers used greater sentence length in oral language production. This was also true of sixth-grade

readers who were good in oral and silent reading. They were also found to make more use of movable, subordination, and to use more linguistic patterns.

Frequent Versus Infrequent Language Patterns

Strickland (1962) discovered that frequently used oral patterns of elementary school children differed from those patterns found on the sample of pages taken from reading texts. Ruddell (1965), using fourth-grade students, went a step further. Using the language patterns discovered in Strickland's study, he constructed paragraphs of frequently used syntactic patterns. From these he constructed a cloze test. The results showed that there was a significant difference in comprehension of the differing passages in favor of the more frequently used patterns. As Schneyer (1970) points out, infrequent patterns may complicate the cloze task, since to a large degree it is a measure of redundancy.

Tatham supported Ruddell's results with two studies. In the first study (1968), Tatham used Ruddell's frequency patterns to make up a high-frequency passage and a low-frequency passage. Multiple-choice questions were used to test comprehension of these passages. The questions tested for literal comprehension, inferential comprehension, evaluation, and appreciation.

Fourth-graders were used to make the study comparable with Ruddell's study. Two different intelligence groups (I.Q. of 90 to 115 and 120 and above) were also used. The passage containing frequently used oral language patterns was comprehended better than the other passage. The difference in comprehension scores between intelligence levels was significant at the .05 level.

Tatham's 1970 study also supported Ruddell's results. Again Strickland's data were used to determine which sentences frequently appear in children's language. Tatham's test involved one sentence and three pictures, one of which correctly depicted the meaning of the sentence. Her subjects included fourth-graders and second-graders. Her results showed that significantly more second- and fourth-graders obtained higher scores on the test using the more frequently used oral patterns than on the test using less frequent oral patterns. Fourth-graders significantly out-performed second-graders on both tests.

Smith (1970) was interested in the relation between written language patterns as produced by students at various grade levels and the ability of students at these same grade levels to understand these patterns. Smith (1970) used an instrument developed for a study conducted by Hunt (1970).

Hunt (1970), in his study of school children in grades 4, 6, 8, 10, 12 and of skilled and unskilled adult writers, used an instrument of 32 short (mean: 4-1/3 words) sentences on the process of extracting aluminum from bauxite. He instructed his subjects to combine sentences in any way they saw fit without adding or deleting any information. His basic measuring unit was the t unit: ". . . one main clause plus any subordinate clause or non-clausal structure attached or embedded in it [p. 4]." He found that t-unit length steadily increased over the grades and that this trend continued with an increase of t-unit length by the skilled adult writers over twelfth-grade performance. The number of t units per sentence went steadily downward. Within the normal curve of each grade, the trend already noted was found with high achievers (on other achievement tests) having a higher mean t-unit length than the middle group which in turn had a higher mean than the lower group. The difference between the high and low groups was significant at the .05 level.

Smith (1970) used Hunt's protocols to reproduce patterns of written language produced by children at grades 4, 8, and 12 and skilled adults. Smith discovered that children in grades 4, 10, and 11 differed significantly in comprehension of the four levels of writing. Grades 4, 5, and 6 read fourth-grade writing best. The

eleventh grade had the most difficulty with fourth-grade writing of all the passages they read. Students in grades 8 through 12 found that it was easier to read eighth-grade writing than either fourth-grade writing or passages by twelfth-graders or skilled adults.

Carroll (1970), using third-, sixth-, and ninth-graders as subjects, tested them for their knowledge of the less frequent grammatical usage of words that may occur in more than one function. Two instruments were used. One instrument had words in high, low, or anomalous usage. The subject had to indicate whether the words were correctly used. The other measure called for paraphrasing an underlined word. For 90% of the words the subjects had significantly more difficulty in comprehending the less frequently used grammatical meaning. Again, the results seem to indicate that repeated exposure strengthens comprehension.

Awareness of Structure and Reading Comprehension

O'Donnell (1962) found a moderate correlation between comprehension and knowledge of grammar (.46) and between comprehension and awareness of structure (.44). But awareness of structure (ability to actually pick it out as demonstrated by author's test) is more highly related to reading than knowledge of traditional grammar.

This conclusion was arrived at despite the above correlation by application of a partial correlation to "partial out" knowledge of vocabulary. Knowledge of vocabulary accounted for most of the relationship between reading and knowledge of grammar test scores. O'Donnell concludes, however, that the relationship is not high enough to justify teaching grammatical structure as a major means of developing reading comprehension. O'Donnell's subjects were 101 high school seniors.

Crews (1968) computed change scores on fourth-grade students who had participated in either a traditional grammar program or a linguistically oriented grammar program. In the latter program, the students were taught sector analysis which included instruction in the recognition of various units within the total sentence structure which are shiftable. This can lead to greater flexibility of structures. An analysis of writing samples and the Gates-MacGinitie Reading Test, Survey D, were the instruments used for evaluation. Results, significant at the .001 level, favored the experimental group in a variety of sentence structures produced, and favored the control group in reading comprehension.

Number and Complexity of Structures and Reading

Nurss (1966) used picture comprehension and oral reading scores to measure the difficulty of reading

sentences that differed in structural depth (number of transformations removed from kernel sentences) and structural organization (complex, compound, or simple). Subjects were second-grade students. Oral clues pointed to the fact that sentences with greater structural depth were more difficult to read. But this was not supported by the picture comprehension test. The hypothesis that more complex sentences would be more difficult to read failed to receive support from either test.

Both Marcus and Simons base their studies on the generative-transformational grammar concept of deep structure. Deep structure, as defined by Wardhaugh (1969), is: "The abstract structure postulated as underlying a sentence. It contains all the information necessary for semantic interpretation of that sentence [p. 152]." Two sentences that are paraphrases have the same deep structure but different surface structures.

Simons (1970) investigated two questions: what is the relationship between the ability to recover deep structure and reading comprehension, and is the skill of making a lexical analysis of the main verb positively related to reading comprehension? To answer the first question, Simons correlated the scores from his Deep Structure Recovery Test (DSRT) with the scores from two different comprehension tests. One was a cloze test and

another a traditional comprehension test (the reading subtest of the Metropolitan Achievement Test). Recovery of deep structures (as measured by the DSRT) appears to be an important factor in reading comprehension. It is more important in cloze than with the MAT reading test. Word knowledge is more important on the MAT reading test than word recognition, I.Q., or the ability to recover deep structure. Apparently the two tests are testing for different skills. In the cloze test, it is reasonable to infer that recovery of deep structure is a necessary minimum to recovering meaning since the blanks force the person who is taking the test to predict meaning, while such prediction may not be involved in a traditional multiple-choice comprehension test.

The second question regarding lexical analysis of the main verb was investigated through a sentence completion test and a subsection of the DSRT. The results showed that the sentence completion test has a small but positive statistically significant relationship to reading comprehension as measured by cloze and none by the MAT reading test. For boys, lexical analysis of the main verb was moderately related to reading comprehension as tested by cloze and the MAT reading test. For girls, there was no relationship to either measure. The same skill as measured by the DSRT was not related to reading

comprehension as measured by the cloze test. Subjects were fifth-grade students.

Marcus (1971) developed a test for the purpose of diagnosing specific difficulties with basic syntactic structure. Using a test with 102 questions that tested 17 grammatical structures, Marcus found that an interruption of the subject-verb-object sequence by a relative clause in complex sentences caused more difficulty than if the clause did not interrupt that sequence. He further concluded that some students did not distinguish between denotated and implied meaning of words. Some students showed a lack of understanding of semantic and syntactic meaning of some function words. The subjects of this study were in grades 4 through 8. The A Test of Sentence Meaning used for this study was similar to Simons' Deep Structure Recovery Test. Both used a multiple-choice format based on paraphrase. Marcus' test had more variety in format, designated what structures were being tested, and was of greater length.

The degree to which understanding various conjunctions related to reading comprehension was investigated by Stoodt (1970). She gave her fourth-grade subjects two tests for comprehension of conjunctions, a multiple-choice and cloze test. Stoodt found that there was a significant relationship between understanding

conjunctions and reading comprehension. Stoodt also found that there is a significant difference in difficulty of various conjunctions.

Fagan (1971) was interested in exploring the question of whether the number and type of transformations in a passage would affect reading comprehension. Using a cloze procedure with these fourth-, fifth-, and sixth-grade subjects, Fagan found that deletions and embedding tended to make sentences more difficult. He concluded that sentence difficulty, more than paragraph difficulty, was dependent on the difficulty of transformations, and that this was probably due to redundancy. The number of transformations within a sentence were not found to affect difficulty of comprehension. This did not agree with the results of some previous researchers.

Bormuth, Carr, Manning, and Pearson (1970), using fourth-grade subjects, divided some 55 skills into three broad categories: sentence, anaphora, and intersentence. Paragraphs were constructed and four different types of wh-questions were asked to determine literal comprehension. The test was given to fourth-grade subjects. The mean percentages of correct answers were as follows: sentence 73%, anaphora 77%, and intersentence 58%. Bormuth concluded that the three skills tested were homogeneous since there was a significantly greater difference

in difficulty between skills than between different measures of the same skill. There is also some evidence that there may be some hierarchies among skills.

Oral Miscues and Comprehension

Ordinarily we think of oral miscues as giving a clue to a student's word recognition skills, and as such would not be evidence to consider in a chapter surveying syntax and comprehension. Goodman (1972) admits that a student can learn to phonologically decode without comprehension as a bar-mitzvah boy may learn Hebrew script to recode into chanted oral Hebrew without understanding what he is chanting. But decoding normally engages the reader in semantic analysis and prediction of meaning and syntactic order. Goodman states that on the basis of his research he found that proficient readers decode directly from graphic stimulus, then encode from the deep structure.

> Their oral output is not directly related to the graphic stimulus and may involve transformation in vocabulary and syntax, even if meaning is retained. If their comprehension is inaccurate, they will encode this changed or incomplete meaning as oral output [p. 63].

This becomes clear in a case study cited by Goodman (1972). A fourth-grader read the line "Might as well study word meanings first" as "Might as well study what it means [Goodman, 1972, p. 58]."

Using the same basic reasoning, Ohaver (1971) explored the difference in reading tactics between college freshmen who scored 12 or more percentile points higher on either the vocabulary or comprehension subtest of The Nelson-Denny Reading Test than they scored on the other subtest. Ohaver used an expression type instrument with sentences, semi-grammatical sentences, and ungrammatical strings randomly assembled together. He found that the higher comprehension students used both syntactic and semantic cues, while the higher vocabulary students used mainly syntactic cues. He concluded that higher comprehension students were trying to recover meaning.

Sex and Other Possible Moderating Variables

The majority of studies surveyed did not report any findings on moderating variables.

Ruddell (1965), in his study of frequent and infrequent language patterns, found that significant differences existed at the .01 level between comprehension scores in relation to (a) father's occupational level, (b) educational background of parents, (c) intelligence and mental age, and (d) chronological age of subjects. No significant difference was found in comprehension scores in relation to sex although there is an interaction

significant at the .05 level, suggesting that boys have more difficulty than girls comprehending low-frequency patterns.

Tatham (1970), who was also interested in frequent vs. infrequent oral language patterns applied to reading, found that girls did consistently better in cross-grade sex comparisons; but with one exception it was not significant. The total group of girls did significantly better than the total group of boys on the test of frequent oral language patterns. But, in general, Tatham concluded that the results of the study indicated great variation of ability within each sex, rather than pointing to treatment of each sex as a group.

Stoodt (1970) found that there were significant relations between understanding conjunctions and sex, socioeconomic levels and intelligence, all in the expected directions.

Simons (1970) found that girls were superior to boys in recovery of deep structure, but that there was no sex difference in the importance of the skill as an aspect of reading comprehension when measured by cloze. For both sexes, the ability to recover deep structure is a more important aspect of reading comprehension as measured by cloze than is I.Q., word knowledge, and word

recognition skill. For boys, word recognition skill and skill of recovering deep structure are both more important in reading comprehension as measured by the Metropolitan Achievement Test, Reading Subtest, than word knowledge or I.Q. For girls, word knowledge is much more important than the other three skills on the MAT Reading Test.

Improvement of Performance Over Age and Grade

In those studies where more than one grade was involved, it is of interest to see if older students did better on the task than students had done in preceding grades.

Marcus found that students did better in each higher grade from fourth grade to eighth grade. This was true even though word knowledge was controlled, time unlimited, and structures presumably "basic" ones. There was a 21-point difference between the fourth- and the eighth-grade mean scores. In Smith's study (1970), the older students (tenth-, eleventh-, and twelfth-graders) read consistently better than the fourth-, fifth-, and sixth-graders on all levels of writing. Although Fagan's study (1971), had subjects ranging from 9 to 12 years of age in grades 4 through 6, there is no mention of significant results relating to these two factors. Tatham

(1970) dealt with two grade levels in her study. The fourth-graders out-performed the second-graders on both frequent and infrequent syntactic structures. Carroll (1970) used students in the third, sixth, and ninth grades. He concluded that acquisition of lexico-grammatic meaning was a slow process far from complete by the ninth grade. Each succeeding grade did better than the preceding one.

Summary

To summarize, the various categories into which the studies were grouped will be reviewed briefly.

a. There is apparently a positive relationship between oral language development and exposure to reading (Chomsky, 1971) and between oral language development and successful reading (Loban, 1966; Strickland, 1962).

b. Syntactic patterns which appear more frequently in students' language are easier for students to comprehend in reading (Carroll, 1970; Ruddell, 1965; Tatham, 1968, 1970). There is also evidence that there is a relationship between patterns frequently used in a student's writing and ability to comprehend such patterns when they appear in reading (Smith, 1970).

c. There seems to be somewhat contradictory evidence in regard to awareness of structure and reading comprehension. O'Donnell (1962) found a higher correlation

between the awareness of structure and comprehension than between knowledge of traditional grammar and comprehension. But neither correlation was high. Crews (1968) discovered that a linguistically oriented course resulted in more variation of structure in students' writing, but that students who took a traditional grammar course made greater advances in reading.

d. Nurss (1966) found that there was no support for the idea that complex sentences made comprehension more difficult. Greater structural depth made oral reading more difficult, but not silent reading according to the results of the picture comprehension test. Several studies showed that students had not completely mastered various syntactic patterns.

e. By use of oral reading miscues, Ohaver (1971) was able to infer a difference in reading strategies by college freshmen who scored 12 percentile points higher on either the vocabulary or comprehension part of a reading test than they did on the other part.

f. Sex differences were found by Ruddell (1965) in an interaction, suggesting that boys had a more difficult time than girls in comprehending low-frequency language patterns. Tatham noted that girls did significantly better than boys on the frequent oral patterns. Stoodt (1970) found relationships between sex, SES, and

intelligence with the ability to understand the relationships signaled by conjunctions. Simons (1970) also found that girls interacted with the two measures in a different way than boys.

g. In general, there was an improvement in comprehension of the various syntactic patterns as grade and age progressed (Carroll, 1970; Marcus, 1971; Smith, 1970; Tatham, 1970).

CHAPTER III

PROCEDURES

This chapter will define the population involved in this study, discuss the selection and construction of tests used in this study, and describe the design of the study.

Population

Three categories of subjects were used for this study: ninth-grade slow readers, ninth-grade good readers, and sixth-grade readers. The Nelson Reading Test was used for the initial screening with 52 slow ninth-grade readers, 49 ninth-graders from heterogeneous ninth-grade English classes, and 40 students placed in the sixth grade. As a result of this screening, 30 slow ninth-grade readers (grade equivalents 5.0 to 7.5), 30 good ninth-grade readers (grade equivalents 8.7 to 10.5), and 18 sixth-grade readers (grade equivalents 5.0 to 7.5) were available as subjects for the study.

The population of the Hunterdon Central High School district, from which the subjects of this study were chosen, is predominantly white, middle class and rural, residential (suburban), or small town. Of a total

population of 24,356, 196 persons are listed as being of races other than Caucasian. Of this number, 111 are black (Hunterdon County Planning Board, 1972).

The median income for the area is $11,337 (Bureau of Census, 1972).

Of the population of the county, 72.3% is classified by the Census Bureau as rural, non-farm population; 12.1% of the county is classified as rural farm population. The most populous town of the school district is Flemington, with a population of 3,917 (Bureau of the Census, 1972).

There is considerable commuting from this area. Only 55% of all workers in the county work in the county of residence (Bureau of the Census, 1972).

Selection of Tests

The Nelson Reading Test, Revised Edition, was the test chosen to measure the reading level for this study. Because this study involved subjects residing at, and placed at, different grade levels, the broad range of norms covering the elementary and junior high grades (grades 3 to 9) was necessary if one test was to be used for all subjects.

The Nelson Reading Test gives three scores, a vocabulary score, a paragraph comprehension score, and a total reading score. One hundred items measure vocabulary

in context. Seventy-five items measure the three skills of reading for main idea, reading for detail, and predicting outcomes. The 1962 revision of the test (with new norms) added some more difficult and varied material to the test. Item analysis was computed for items from the three earlier forms to make a more discriminating test.

Alternate form reliability coefficients for grade 6, which was one of the grades involved in this study, was .87 for the vocabulary subtest, .85 for the paragraph subtest, and .91 for the total score. At the ninth-grade level, the alternate form reliability coefficient is .86 for the vocabulary subtest, .87 for the paragraph subtest, and .92 for the total score.

Congruent validity was established with the Iowa Test of Basic Skills and The Nelson-Denny Reading Test. At the sixth-grade level, the correlation coefficient between vocabulary scores on The Nelson Reading Test and the subtest of the Iowa Test of Basic Skills is .73. The coefficient between the two paragraph subtests is .76. At the ninth-grade level, the correlation coefficient between the total reading scores of The Nelson-Denny Reading Test and The Nelson Reading Test is .84 (Nelson, 1962).

Standardization procedures were characterized by

H. A. Robinson to be "meticulous and comprehensive [in Buros, 1965, p. 802]." A multiple-cluster sampling plan was used with the whole country as the original base; 8,544 students were used for Form A which is the form used in this study (Nelson, 1962).

The standard error of measurement for Form A, sixth grade, in terms of grade equivalents (in months), is 2.4; in raw scores it is 3.38. The standard error of measurement for Form A, ninth grade, is 3.0 months in terms of grade equivalents and 3.0 points in terms of raw scores (Nelson, 1962).

Two of Robinson's criticisms of the test are that the answer sheets may be difficult for the youngest students to handle and that the norms do not go high enough for very good readers in the junior high (in Buros, 1965). The first criticism does not apply to the subjects of this study because these subjects do not include third-, fourth-, or fifth-graders. The second criticism does not pertain because our cutoff point for purposes of selection was 10.5 so that the norms are adequate.

The one telling criticism is that some of the alternative answers in the comprehension section are too easily eliminated. Nevertheless, Robinson concludes that The Nelson Reading Test is ". . . an adequate gross measure of reading achievement [in Buros, 1965, p. 802]."

A Test of Sentence Meaning, developed by Albert D. Marcus, was used as the main instrument of this study.

Marcus (1971) selected his syntactic categories from those described as basic by the structural linguist, W. Nelson Francis. According to this version of structural grammar, "all syntactic structures in sentences are manifestations of one or more of these types [p. 50]." The four categories are defined by Marcus in the following manner.

a. Structures of modification consist of two immediate constituents, a head and a modifier.
b. Structures of predication consist of two immediate constituents, a subject and a predicate.
c. Structures of complementation consist of two immediate constituents, a verbal element and a complement.
d. Structures of coordination have two or more immediate constituents, which are syntactically equivalent units joined in a structure which functions as a single unit [p. 50].

Marcus (1971) turned to a transformational-generative theory of grammar to develop the test that could measure a student's skill at deriving meaning from the above structures. According to this theory, sentences having different surface structures can be generated from the same kernel sentence or sentences. Test items were developed by ". . . factoring sentences into their underlying kernels and by comparing transformations with equivalent meaning [p. 51]."

Lexical content and internal punctuation were

controlled. The most frequently used words from the lists of Dale, Thorndike and Lorge, and Rinsland were used. (In addition, when the tests were given, the examiners offered to answer questions of pronunciation and meaning if a student made such a request [Marcus, 1971].)

From 27 structures which the literature suggest may cause problems in reading comprehension, 17 were selected and classified within the four categories already given. A fifth category was constructed for a combination of structures.

Using the basic principle that discrimination between same and different meanings indicated ability to derive meaning from structures, Marcus developed four different formats for his multiple-choice questions. Format 1 called for identifying another sentence with the same meaning as the lead sentence. Format 2 required the identification of the one sentence that did not have the same meaning as all the others. Format 3 required the test-taker to break down sentences into kernels and recognize statements that said something true about a given sentence. Format 4 required the test-taker to select two sentences which together gave the whole meaning of the lead sentence.

Test items were submitted to three linguists who

independently evaluated the items as to whether they were actually the designated structures, whether they were natural sentences, and whether meanings were equivalent or different as the item required.

The test consists of 102 items. Six items test each of the grammatical structures.

The ATSM was administered by Marcus to 487 boys and girls in grades 5, 6, 7 and 8 from disadvantaged area schools and from middle-class area schools.

Reliability, using the Kuder-Richardson Formula 20, was computed for each item for all four grades. Reliability coefficients ranged from .95 for grade 5 to .89 for grade 8.

As was expected, grade averages increased from the fifth to eighth grade with the eighth grade averaging 21 more items correctly answered than the fifth grade (Marcus, 1971). The mean percentage increased fr the fifth to the eighth grade for each of the 17 structures also (Marcus, 1971).

Although the test was given to a relatively small number, the ATSM showed evidence for reliability and content validity which made it a good instrument for this study.

Study Design

The Nelson Reading Test, Revised Edition, was administered to the available population of sixth-graders,

ninth-grade slow readers, and a class of ninth-grade readers from heterogeneously grouped English classes. Due to the limited available population for this study, the entire population scoring between the desired ranges was used.

The Nelson Reading Test was administered to 52 ninth-grade students taking a special reading course for students reading one or more years below grade level. From this population, 30 students who scored from 5.0 to 7.5 in grade equivalents were selected as subjects for this study. The mean reading level (in grade equivalents) of this group was computed. The mean level rounded off to 6.1.

The Nelson Reading Test was also administered to ninth-grade students from heterogeneously grouped English classes. Thirty-two students scored between 8.5 and 10.5. The lowest two readers within this range were eliminated for purposes of widening the gap between the two reading ranges involved so that there would be a greater chance of population differences. This brought the range to 8.7 to 10.5 for the group designated as "good ninth-grade readers."

From 46 sixth-graders, 18 scored between 5.0 and 7.5, which was the range of the ninth-grade slow readers. These 18 sixth-graders became the "sixth-grade readers"

for this study.

Since this study was administered about halfway through the school year, the range for each category appears to be reasonable, taking into account the normal range of students at any grade level.

The students in the three categories meeting the reading level criteria were then given A Test of Sentence Meaning (ATSM). The standardized instructions developed by Marcus were read to each group. This included instructions to the students to raise their hands and ask for words to be pronounced or meanings given. This was to further discount the vocabulary factor in this study. The testing sessions were divided into three parts. Students who could not finish within an allotted period were given extra time.

Results were analyzed using the Kruskal-Wallis one-way analysis of variance by ranks. This test was used to determine if any of the three groups of subjects came from genuinely different populations (Siegel, 1956). A post hoc procedure was used to determine which of the groups came from genuinely different populations. The Kruskal-Wallis formula was used because the low number of subjects in the sixth-grade group indicated that the data should be treated as non-parametric data.

A Pearson-Product Moment Correlation was also

calculated to determine the degree of relationship between reading scores and scores on the ATSM for each of the three groups.

CHAPTER IV

FINDINGS AND DISCUSSION

The purpose of this study was to explore the ability of ninth-grade slow readers to comprehend various syntactic structures in comparison with ninth-grade good readers and readers reading on about the same grade level as the slow ninth-grade readers. The mean reading level of the slow ninth-grade readers, in terms of a grade equivalent, was 6.1. A sixth-grade group of readers with the same range in terms of grade equivalents was chosen as the third group for purposes of comparison.

The grade levels at which each group read was determined by administering The Nelson Reading Test.

A Test of Sentence Meaning (ATSM), developed by Albert D. Marcus, was administered to all subjects.

Presentation of Data

For purposes of comparing the ability of ninth-grade slow readers, ninth-grade good readers, and sixth-grade readers, scores for the three different groups were ranked and the Kruskal-Wallis formula was used because the sixth-grade group was composed of only 18 subjects. The Kruskal-Wallis formula is for one-way analysis of

variance of nonparametric data. The Kruskal-Wallis one-way analysis of variance is computed for the purpose of deciding whether a given number of independent samples are from different populations as opposed to representing mere chance variation as expected among several random samples of the same population. The use of this procedure assumes an underlying continuous distribution Siegel, 1956).

The raw scores from the ATSM were ranked and the Kruskal-Wallis one-way analysis of variance was computed. The results were significant at the .001 level. A post hoc procedure was then used to determine between which groups there was a significant difference. Results showed that there was a significant difference between the performance on the ATSM by the slow ninth-grade readers and the good ninth-grade readers. There was no significant difference between the sixth-grade readers and either of the other two groups.

To explore the relationship between comprehension of syntax as measured by the ATSM and reading ability, a Pearson Product Moment Correlation was computed between each group's raw scores from the ATSM and their raw scores from The Nelson Reading Test. The resulting correlation coefficients were .70 for the sixth grade, .23 for the ninth-grade slow readers, and -.03 for the

ninth-grade good readers (Table 1).

For a slightly more detailed picture of the performance of the three different groups on the 17 syntactic structures that were tested in the ATSM, a profile of the average performance of each group on each of the 17 structures was plotted on a graph (see Figure 1).

Each syntactic structure was tested by six multiple-choice items. The cluster of six items was graded good (0-1 wrong), fair (2 wrong), or poor (3 or more items wrong), according to Marcus' design. For purposes of comparing the performances of the three groups on the 17 individual syntactic structures, the good, fair, and poor were converted to ranks of 3, 2, 1, respectively. A mean rank for each group's performance on each item was computed. These mean ranks, carried to the hundredth place, were plotted on a graph. To further interpret the graph, a mear rank score and a median rank score were computed for each group (see Table 2). The mean rank for the ninth-grade slow readers was 1.68, the median score, 1.57. The mean rank for the sixth grade was 2.01, the median score, 2.06. The mean rank for the ninth-grade good readers was 2.34, the median score, 2.37.

Discussion

As a result of this study, hypothesis A (p. 5), there is no significant difference between the mean scores

TABLE 1

MEAN, STANDARD DEVIATION, AND CORRELATION FOR RAW SCORES OF THE NELSON READING TEST AND A TEST OF SENTENCE MEANING

	Mean raw score		Standard deviation		Correlation between raw scores of ATSM and NRT
	ATSM	Nelson Reading Test	ATSM	Nelson Reading Test	
Sixth-grade good readers	65.4	73.3	14.6	10.7	.70
Ninth-grade slow readers	51.8	74.7	18.9	12.1	.23
Ninth-grade good readers	77.1	113.3	10.8	6.6	-.03

Seventeen syntactic structures of A Test of Sentence Meaning in order that they appear in Figure 1.

1. Direct object/indirect object sequence.
2. Relative clause modifies subject.
3. Passive voice in relative clause.
4. Relative clause modifies direct object.
5. Relative clause modifies object of preposition.
6. Complex sentences with two relative clauses.
7. Direct object/objective complement sequence.
8. Subjective complement embedded as modifier.
9. Prepositional phrase modifiers.
10. Passive voice in simple sentence.
11. Included clauses.
12. Recognition of transformation of nominalizations into active verbs.
13. Coordination of phrases.
14. Elliptical structures of coordination.
15. Coordination of subordinate clauses.
16. Coordination of independent clauses.
17. Combination of structure.

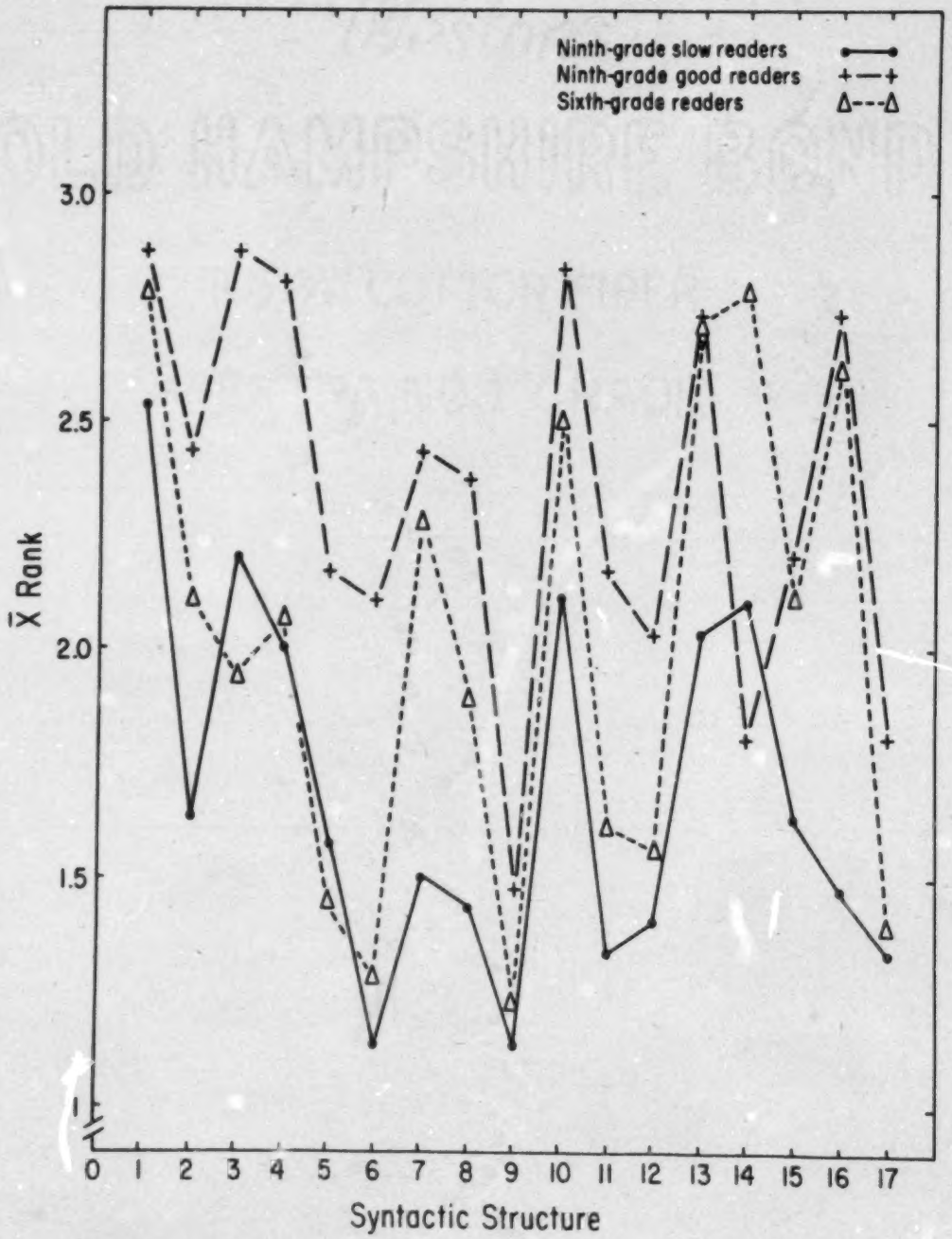

Figure 1. Mean rank scores of three groups of readers on seventeen syntactic structures.

TABLE 2

MEAN AND MEDIAN RANK SCORES
(FOR FIGURE 1)

	Mean rank score	Median rank score
Sixth-grade readers	2.01	2.06
Ninth-grade slow readers	1.68	1.57
Ninth-grade good readers	2.34	2.37

on the ATSM of the ninth-grade slow readers and the ninth-grade good readers, is rejected. Hypothesis B, there is no significant difference between the scores on the ATSM of the ninth-grade slow readers and sixth-grade readers who are placed in, and reading on, the mean reading grade level of the slow ninth-grade readers, cannot be rejected.

Good ninth-grade readers evidently comprehend the syntactic structures tested by the ATSM at a significantly higher level than slow ninth-grade readers. This lack of comprehension on the part of slow ninth-grade readers may contribute to their slow development in reading. This lack of comprehension may, in turn, be affected by intelligence which was not measured in this study. It may also be affected by affective factors found both in their attitude toward reading in general, and more specifically found in the testing situation. The ninth-grade slow readers found the ATSM to be long, repetitive in the type of task performed, and generally frustrating. This was evidenced through comments such as "Do we have to finish this?" and gestures such as rubbing the eyes and turning to gaze frequently out the window. The ninth-grade slow readers took longer to complete each section than either of the other two groups.

The sixth-grade readers' performance on the ATSM was not identical with the performance of the ninth-grade

slow readers as can be seen by the difference in mean ATSM scores. The ninth-grade slow readers' mean raw score was 51.8, the sixth-grade readers' was 65.4. The difference can also be seen in the profiles of the two groups' performance on the 17 syntactic structures (see Figure 1). The size of the sixth-grade group (n = 18) may have also affected the outcome.

Another indication that the sixth-grade group and the ninth-grade slow readers did not perform equally was the difference in correlation coefficients between the two groups as a result of correlating raw scores from the ATSM and The Nelson Reading Test. This was true even though their mean reading scores were close (see Table 1). The sixth-grade readers had a relatively high correlation of .70. The ninth-grade slow readers had an almost non-existent correlation of .23. A further correlation was computed between the ninth-grade slow readers' raw comprehension subtest score of The Nelson Reading Test and the ATSM. The correlation coefficient was .25. This ruled out the involvement of the vocabulary subtest in the correlation, though it obviously did not rule out the vocabulary factor in the comprehension subtest.

This seems to indicate that in some ways the two reading populations differed in strategies in reading. The ninth-grade slow readers may rely more heavily on

redundancy and overall contextual clues when reading. The sixth-grade readers may rely more heavily on comprehending each individual sentence, a task more comparable to that performed on the ATSM. The Nelson Reading Test, comprehension subtest, involves reading a paragraph and answering three multiple-choice questions covering prediction, main idea, and detail. The test might not have been sufficiently diagnostic for this study. A cloze test, which involves the ability to place words correctly according to syntax, may have yielded a higher correlation with the performance of the ninth-grade slow readers on the ATSM.

Many of the factors discussed above also apply to the ninth-grade good readers. An additional factor should be mentioned. The mean raw score for the ninth-grade good readers on The Nelson Reading Test was 113.3. The standard deviation was 6.6 (see Table 1). The scores cluster around the mean in a manner that makes correlations, essentially a ranking procedure, difficult to make. A larger group might have had a higher correlation.

It is not the purpose of this paper to analyze the syntactic structures in this test in detail. But it is evident that each group found some structures more difficult than others. A brief look at the structures that gave the most difficulty will give more meaning to

the graph presented in Figure 1.

The rank of 2 represents "fair" comprehension of each syntactic structure involved. The ninth-grade slow readers scored less than 2 (or fair comprehension) on 11 syntactic structures. The sixth-grade readers scored less than "fair" on 8 structures. The ninth-grade good readers scored less than "fair" on 3 structures. The groups themselves come out ranked with the ninth-grade slow readers at the bottom, the ninth-grade good readers at the top, and the sixth-graders in between.

The ninth-grade slow readers was the only group to rank below 2 on structure 2, relative clause modifies subject. Example: "The boy to whom she gave the rabbit climbed through the hole in the fence [Marcus, 1971, p. 58]." Two possible difficulties in comprehension might be the interruption of the subject-verb sequence and the problem of pronoun reference.

The mean of the sixth-grade readers fell a little below 2 (1.94) on structure 3, passive voice in relative clause. Example: "The two men who were attacked by the police ran around the corner [Marcus, 1971, p. 59]." Since the passive voice in the simple sentence did not give this group much difficulty, it seems safe to conclude that it was the relative clause that made this construction difficult.

Structure 5, relative clause modifies object of preposition, gave difficulty to both the sixth-grade readers and the slow ninth-grade readers. Both groups had a mean rank less than 2. Although the ninth-grade good readers ranked above 2, they dipped below their own median of 2.37. Example: "The uncle of the boys who were swimming drowned in a boat accident yesterday [Marcus, 1971, p. 59]." Again the problem appeared to be one of pronoun reference.

Both the sixth- and the ninth-grade slow readers had considerable trouble with structure 6, with scores of 1.28 and 1.14, respectively. Although above 2, the ninth-grade good readers fell below their own median score. This structure dealt with complex sentences with two relative clauses. Example: "The woman whom Uncle Robert admired handed the gift to the doctor whom she visited [Marcus, 1971, p. 59]." The problems seem to be a repetition of those mentioned above: interrupted subject-verb sequence and pronoun reference.

Only the ninth-grade slow readers fell below the rank of 2 for structure number 7, direct object/objective complement sequence. Example: "He brought the woman her son [Marcus, 1971, p. 60]." The transposing of the direct object to the end of the sentence and the deletion of 'to' might be a relatively unfamiliar pattern for the

ninth-grade slow readers.

Structure 8, subjective complement embedded as modifier, gave trouble to both the sixth-grade readers and the ninth-grade slow readers with scores of 1.89 and 1.43, respectively. Example: "The old man outside owns a small cat [Marcus, 1971, p. 61]." It is difficult to see what the problem is here. There must have been some difficulty in determining which noun was being modified.

Structure 9, prepositional phrase modifiers, was the nadir of performance for both the sixth-grade readers and the ninth-grade good readers with scores of 1.22 and 1.47, respectively. The ninth-grade slow readers' score of 1.13 was the lowest score of this group shared with the same score for structure 6. This apparently was the most difficult structure for all three groups. Example: "Jane gave the cooky behind the jar to the boy [Marcus, 1971, p. 58]." Again there is the problem of what does the modifier modify.

Structure 11, included clauses, gave difficulty to both the sixth-grade readers and the ninth-grade slow readers. Both groups scored below 2. Although the ninth-grade readers did not fall below the rank of 2, or 'fair' comprehension, they did fall below their own median score. Example: "Everyone knows that he is a liar [Marcus, 1971, p. 62]." The use of a clause in place of a

word for a part of speech must be a complicating factor in comprehension.

The sixth-grade readers and the ninth-grade slow readers fell below 2 on structure 12, recognition of transformation of nominalizations into active verbs. The ninth-grade good readers, while ranking above 2, fell below their own median score. Example: changing "on Bob's instructions . . ." into "Bob instructed . . . [Marcus, 1971, p. 60]." The difficulty of changing from one part of speech to another is obvious.

For some unknown reason, the ninth-grade good readers dipped below the fair comprehension mark on a structure that neither the sixth- nor the ninth-grade poor readers had difficulty with. Structure 14, elliptical structures of coordination, involves deletion of elements given previously in the sentence. Example: "Anne asked Jane to come at six and Mary at noon [Marcus, 1971, p. 62]." Either this construction becomes less frequent in the reading the good ninth-grade readers are exposed to, or this dip was one of the vagaries of testing.

The ninth-grade slow readers had trouble with structure 15, coordination of subordinate clauses. Example: "The horse jumped because he saw a snake and because the rider frightened him [Marcus, 1971, p. 61]." In some of the items for this structure (but not the above

example), the subject-verb sequence was interrupted. It is possible that the mere length of some of these sentences was confusing. The ninth-grade good readers ranked above 2, but below their median score.

Coordination of independent clauses, structure 16, gave problems to the ninth-grade slow readers while both the sixth-grade readers and the ninth-grade good readers ranked better than their median rank scores. Example: "Not only is she intelligent, but she is also beautiful [Marcus, 1971, p. 61]." This structure, as above, may show a difficulty in comprehending the use of various conjunctions.

All groups fell below "fair" comprehension on the last item, structure 17, combination of structures. Example: "Mary complained that no one was helping her clear off the tables in the dining room since the group decided that Betty should be relieved of housekeeping duties because she cooked meals [Marcus, 1971, p. 62]." Many of the possible comprehension problems mentioned earlier could apply here.

It is evident that these syntactic structures are not completely mastered by any of the three groups as a whole although there was one student in the ninth-grade good readers who received a ranking of "good" on all 17 structures, and 10 students from the ninth-grade good

readers received only "fairs" or "goods" for each of the 17 structures. But even among the ninth-grade good readers group performance was not sustained at a high level as is graphically shown in Figure 1. Both the sixth-grade readers and the ninth-grade slow readers showed lack of comprehension for a considerable number of structures. Comparing the sixth-grade readers with the ninth-grade good readers shows improvement over the grades as Marcus (1971) found in his study. Marcus had used subjects in grades 4 through 8.

The low correlations of both ninth-grade groups with the ATSM may be due to the possibility that a survey test like The Nelson Reading Test is not sensitive to this particular factor in reading. Simons (1970) has some research results that lend support to this line of reasoning. Simons has found that recovery of deep structure was an important factor in reading comprehension. He also found that this factor was more important on a cloze passage than on the subtest of the Metropolitan Achievement Test. Word knowledge was more important on the MAT than word recognition, I.Q., or ability to recover deep structure. Fagan (1971) made the observation as the result of his study that sentence difficulty more than paragraph difficulty was dependent on the difficulty of transformations, and that this was probably

due to redundancy.

A number of researchers have made discoveries as to specific difficulties that relate to the difficulties the subjects of this study seemed to have in comprehending some of these structures. Marcus (1971) discovered that his subjects had difficulty when the subject-verb-direct object sequence was interrupted. This appeared to be true in this study in those structures where a clause or prepositional phrase came between these elements. He also noted an apparent lack of understanding of semantic and syntactic meaning of some function words. This was probably true with those structures involving conjunctions which caused considerable difficulty in this study. Stoodt (1970) discovered a significant relationship between understanding conjunctions and reading comprehension for fourth-graders. She further noted a significant difference in difficulty of various conjunctions. Fagan (1971) found that deletions and embedding made sentences more difficult. This would apply to the included clauses which caused difficulty for some subjects of this study and the deletion of 'to' and other words in the elliptical structures of coordination and in the direct object/object complement structure.

Chapter IV presented and discussed the results of this study. Chapter V will summarize the study, present conclusions, and give suggestions for further research.

CHAPTER V

SUMMARY AND CONCLUSIONS

Do slow ninth-grade readers comprehend written syntactic structures on approximately the same level as their peers; or do they comprehend written syntactic structures on approximately the same level as sixth-graders who are placed at, and reading on, the mean reading level of the disabled ninth-grade readers? This is the problem toward which this study was oriented.

Thirty students from 52 ninth-grade students taking a special reading course for slow readers (two years below grade level) scored between 5.0 and 7.5 in grade equivalents on The Nelson Reading Test. These students became the subject for the ninth-grade slow readers group of this study. The mean grade equivalency level for this group was 6.1 (74.7 in raw score, rounded to 75).

From 40 sixth-graders, 18 scored between 5.0 and 7.5 in grade equivalents on The Nelson Reading Test. These students became the subjects of the sixth-grade reading group for this study. The mean of this group in grade equivalents was 6.0.

The ninth-grade slow readers and the sixth-grade

readers had the same range and almost identical means (in raw scores 74.7 and 73.3, respectively) and the same range in grade equivalents of 5.0 to 7.5 as scored on The Nelson Reading Test.

A third group designated "ninth-grade good readers," consisted of 30 students out of 49 who scored from 8.7 to 10.5 on The Nelson Reading Test. The mean for this group was 9.5 in terms of a grade equivalent.

A Test of Sentence Meaning, developed by Albert D. Marcus, was given to all subjects.

The raw scores were analyzed according to the Kruskal-Wallis one-way analysis of variance. They were found to be significant at the .001 level. From a post hoc procedure, it was learned that the significant difference existed between the ninth-grade slow readers' and the ninth-grade good readers' performance on the ATSM. No significant difference existed between the sixth-grade readers' performance and the performance of either ninth-grade group. On the basis of these results, hypothesis A (p. 5), there is no significant difference between the mean scores on the ATSM of the ninth-grade slow readers and the ninth-grade good readers, is rejected. Hypothesis B, there is no significant difference between the scores on the ATSM of the ninth-grade slow readers and the sixth-grade readers, cannot be rejected.

A Pearson-Product Moment Correlation was computed between the raw scores of each group on the ATSM and The Nelson Reading Test. The sixth-grade readers had a correlation coefficient of .70, the ninth-grade poor readers, .23, and the ninth-grade good readers, -.03.

The 17 syntactic structures tested by six items apiece were graded good (0-1 wrong), fair (2 wrong), or poor (3 or more wrong) based on Marcus' (1970) design which he in turn based on probability. For purposes of comparison, "good," "fair," and "poor" were converted to ranks of 3, 2, and 1, respectively. The average performance of each group was computed for each of 17 syntactic structures and plotted to the hundredth place on a graph (see Figure 1).

The mean rank for the ninth-grade slow readers was 1.68, for the sixth-grade readers 2.01, and the ninth-grade good readers 2.34. The median rank scores for the ninth-grade poor readers was 1.57, for the sixth-grade readers 2.06, and for the ninth-grade good readers 2.37.

Conclusions

The significant difference between the performance on the ATSM of the ninth-grade good readers and the ninth-grade slow readers clearly shows that comprehension of syntactic structure is an element in total reading comprehension.

The low correlation between the total reading scores and the ATSM score would seem to indicate that it is not an important factor in reading at this level. However, there are a number of other factors that may explain this low correlation. The ninth-grade good readers, with a mean raw reading score of 113 and a standard deviation of 6.6, are very closely clustered around the mean. As correlation is really a ranking procedure, this may be a factor in the low correlation. If this study had had a larger population to draw from, a randomized sample instead of the whole available population would have been used. This could have made a difference.

It is equally questionable whether The Nelson Reading Test, a survey reading test involving paragraph reading and subsequent answering questions of prediction, main idea, and detail questions, is sensitive enough an instrument for these purposes. Simons (1970) found a significant correlation between the cloze and his Deep Structure Recovery Test (DSRT) and reading. The DSRT is similar in conception to the ATSM. But he did not find a significant correlation between the DSRT and the reading subtest of the Metropolitan Achievement Test. Word knowledge was the important factor in the MAT. Fagan (1971) found that low frequency syntactic structures caused more difficulty with sentence comprehension than with paragraph

comprehension. It is quite possible that the ATSM would correlate more highly with a cloze test which involves the placing of words in the proper "slots" in various sentences.

The correlation of .70 between reading and the ATSM indicates that comprehension of syntactic structures is an important reading factor for sixth-grade readers even on a survey reading test.

The great difference in the correlations between the sixth-grade readers and the ninth-grade slow readers indicates that although these two groups measure on The Nelson Reading Test to be very similar with the same range and almost the same means, they must differ in at least one important respect. The ninth-grade slow readers may have developed strategies based on use of redundancy and overall contextual clues. The sixth-grade readers may rely more on sentence by sentence comprehension. This points to possible limitations on the use of a survey test for placement, pre- and posttesting, and certainly diagnosis.

The Nelson Reading Test has norms for grades 3-9. This large range may reduce the sensitivity of the instrument.

The difficulties that the ninth-grade slow readers experienced might be alleviated by planned exposure

to, and explanation of, those syntactic structures with which they had the most trouble. This, in turn, might help their comprehension, not so much with easy reading with high redundancy, but the cloze type of reading necessary for certain types of texts with largely unfamiliar material where each sentence is important to the logic of the paragraph. This is the kind of material a student frequently encounters in an academic setting.

The profile of group performance on each of the syntactic structures showed that no group as a whole had completely mastered all structures. The ninth-grade good readers did best with only three structures comprehended at less than the level of fair comprehension. The sixth-grade group had considerably more trouble with eight structures below the level of fair comprehension. The ninth-grade slow readers had difficulty with more than half the structures (11 out of 17) at less than "fair" comprehension.

A look at the structures that gave difficulty indicated that interruption of the subject-verb sequence, pronoun reference, deletions, embedding, and conjunctions make comprehension difficult for these readers.

One of the factors here could be memory. Sentences may become more difficult for some students when the reader must retain in his memory a subject which is

not immediately followed by the verb and object.

Comparing the good ninth-grade readers (mean reading level 9.5) and the sixth-grade readers (mean reading level 6.0), it is evident that comprehension of syntactic structures increases over the grades. This supports the findings of previous studies (Carroll, 1970; Marcus, 1971; Smith, 1970; Tatham, 1970).

Research Suggestions

In view of the low correlations for both ninth-grade groups on the ATSM and The Nelson Reading Test and the previous discussion of the limitations of survey test, it would be valuable to compare the performance of ninth-grade good readers and slow readers on the ATSM and a cloze passage.

One of the limitations of this study was the lack of data on the intelligence of the subjects involved. A study that correlates intelligence and syntactic comprehension would be of value.

Using the ATSM or a similar instrument to diagnose difficulties and the prescriptive teaching to correct these difficulties, it would be worthwhile to see if comprehension improved on either or both a survey test and a cloze passage.

Related to this research, a study involving a variety of types of reading, from recreational reading to

closely reasoned informational reading (vocabulary controlled), and a comparison with performance on the ATSM would give important data for the field of reading.

If there can be a difference of reading strategy between an older group of readers and a grade level group having the same range and similar means, it would be of interest to study other possible differences between two such groups. This would enlarge our knowledge of the limitations of grade equivalents as a descriptive device for a student or a group.

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APPENDIX A

A TEST OF SENTENCE MEANING

APPENDIX B

THE NELSON READING TEST,

REVISED EDITION

COMPREHENSION OF WRITTEN SYNTACTIC STRUCTURES BY GOOD READERS AND SLOW READERS

AN ABSTRACT OF A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS UNIVERSITY

THE STATE UNIVERSITY OF NEW JERSEY

BY

BARBARA TAKAHASHI

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

MASTER OF EDUCATION

COMMITTEE CHAIRPERSON: Joseph Zelnick, Ed.D.

NEW BRUNSWICK, NEW JERSEY JUNE 1975

ABSTRACT

The purpose of this study was to compare the performance of ninth-grade slow readers (mean reading level 6.1) to ninth-grade good readers and sixth-grade readers on a test of syntactic comprehension.

The population studied consisted of 30 slow ninth-grade readers (reading range 5.0 to 7.5), 30 ninth-grade good readers (reading range 8.7 to 10.5, mean grade equivalent 9.5), and 18 sixth-grade readers (reading range the same as the slow ninth-grade readers, mean grade equivalent 6.0). These populations came from a predominantly white, rural, and suburban school district.

The instruments used were The Nelson Reading Test and Marcus' (1971) A Test of Sentence Meaning (ATSM). The Nelson Reading Test was used to determine which students scored within the desired ranges. The entire population scoring within these ranges was used for this study.

The ATSM, the criterion instrument, consisted of 102 multiple-choice test items on 17 structures of modification, predication, complementation, and coordination. The vocabulary is at the fifth-grade level or below.

Results. The ATSM mean scores were: ninth-grade good readers 77.1; sixth-grade readers 65.4; and ninth-grade slow readers 51.8. A Kruskal-Wallis one-way

analysis of variance and post hoc procedures were computed. The difference between the ninth-grade slow readers and the ninth-grade good readers was significant at the .001 level.

A Pearson product-moment correlation between the raw Nelson Reading Test scores and the raw ATSM scores revealed the following correlations: sixth-grade readers .7, ninth-grade slow readers .23, and ninth-grade good readers -.03.

Scores on the individual structures tested (six items per structure) were ranked good, fair, and poor according to probability, and converted to ranks of 3, 2, and 1, respectively. The ninth-grade good readers performed below "fair" comprehension (rank of 2) on only 3 structures; the sixth-grade readers scored less than "fair" on less than 8 structures, and the ninth-grade slow readers scored less than "fair" on 11 structures.

Conclusions. The significant difference between the ninth-grade good and slow readers indicates that comprehension of syntax is a factor in the retarded comprehension of slow readers.

The high correlation of The Nelson Reading Test and ATSM of the sixth-graders and the low correlation of the ninth-grade slow readers indicates that the two groups with the same range and almost identical means

have different reading strategies. The sixth-grade readers may depend more on sentence-by-sentence comprehension while the ninth-grade slow readers depend on overall context clues. The nature of the reading test may also account for the low correlation for ninth-grade slow readers and ninth-grade good readers. The literature indicates that a cloze test might have yielded a higher correlation.

No group has entirely mastered the syntactic structures involved. Interruption of the subject-verb sequence, pronoun reference, deletions, embedding, and conjunctions make comprehension difficult for these readers. Memory and exposure may be two factors involved.

Comparing good ninth-grade readers with sixth-grade readers shows that comprehension increased over the grades.

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Fall, 1971		
15:299:564	Remedial Reading	Dr. Fry
15:290:518	Psychology of Personality	Dr. Leon
Spring, 1972		
15:320:561	Foundations of Reading Instruction	Dr. Kling
15:320:565	Laboratory in Remedial Reading	Mrs. Goldsmith
17:610:581	Reading Materials for Children	Mrs. Long
Summer, 1972		
15:290:501	Introduction to Educational Tests and Measurement	Dr. Pascal
15:298:501	Introduction to Counseling and Guidance	Dr. Whitely
Fall, 1972		
15:299:515	Teaching Reading to Secondary, College and Adult Students	Dr. Finn
Summer, 1973		
15:290:601	Independent Studies, Psychological Foundations	Dr. Finn
Fall, 1973		
15:299:566	Seminar in Reading Research and Supervision	Dr. Fry

		Instructor
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15:299:599	Thesis Research	Dr. Zelnick
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